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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/602,504 | 06/24/2003 | Mary F. Doerner | HS1920030094US1 | 2176 |
| 44425 | 7590 | 09/20/2004 | EXAMINER | |
| THOMAS R. BERTHOLD 18938 CONGRESS JUNCTION COURT SARATOGA, CA 95070 | | | LAVILLA, MICHAEL E | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1775 | |

DATE MAILED: 09/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/602,504

Applicant(s)

DOERNER ET AL.

Examiner

Michael La Villa

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>20030624, 20030908</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Drawings

1. The drawings are objected to because Figure 5 is not labeled as Figure 5.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:
3. The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 4-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
 - I. Regarding Claims 4, 7, and 8, it is unclear what is meant by the phrase "preferred direction". What are the criteria for assessing "preferred"?
 - II. Regarding Claim 4, it is unclear what is meant by the phrase "range of interest". What are the criteria for assessing this "range"?

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:
 6. A person shall be entitled to a patent unless –
 7. (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
8. Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Okamoto et al. JP 2001-056925. Okamoto teaches a magnetic recording medium comprised of antiferromagnetically coupled cobalt-containing ferromagnetic layers with a Ru/Fe alloy film. See Okamoto (Abstract; paragraphs 10-22; 52-56; and 60-63). The ferromagnetic layers are described as achieving antiparallel orientation, which would be expected to be accomplished by antiferromagnetic coupling with the Ru/Fe alloy layer.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Okamoto et al. JP 2001-056925. Okamoto teaches a magnetic recording medium comprised of antiferromagnetically coupled cobalt-containing ferromagnetic layers with a Ru/Fe alloy film. See Okamoto (Abstract; paragraphs 10-22; 52-56; and 60-63). The ferromagnetic layers are described as achieving antiparallel orientation, which would be expected to be accomplished by antiferromagnetic coupling with the Ru/Fe alloy layer. Okamoto et al. may not exemplify a laminate comprised of Ru/Fe alloy as claimed. In the event that Okamoto does not exemplify a laminate comprised of Ru/Fe alloy as claimed, it would have been obvious to one of ordinary skill in the art at the time of the

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invention to fabricate a laminate comprised of Ru/Fe alloy as claimed as Okamoto teaches that laminates having coupling layers formed of this alloy are effective magnetic recording media. Okamoto may not exemplify a laminate comprised of Ru/Fe alloy as claimed wherein anti-parallel orientation is achieved. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide for anti-parallel orientation as Okamoto teaches that the laminates of Okamoto are suitable for achieving such anti-parallel orientation. As well, Okamoto teaches varying the thickness of the Ru/Fe alloy layer, and it would have been obvious to one of ordinary skill in the art at the time of the invention to vary this thickness, as effective laminates would be expected through the range of thicknesses. By varying the thickness, the strength of coupling is affected, and it would be expected that the claimed antiferromagnetic coupling would be necessarily achieved inherently at particular suggested thicknesses. See Okamoto, at paragraph 39, for example, where Ru layer thickness is shown to affect whether magnetic orientation is parallel or anti-parallel.

12. Claims 1, 2, and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Girt USP 6,737,172. Girt teaches a magnetic recording medium comprised of cobalt and iron based ferromagnetic layers that are antiferromagnetically coupled by a Ru-based spacer layer. Girt suggests that a cobalt and iron based layer ferromagnetic layer may comprise an interface layer, which is disposed at the interface with the spacer layer. Girt suggests that the spacer layer may

comprise Ru and that the interface layer may further comprise Ru. See Girt (Figure 3; col. 6, lines 34-43; col. 7, lines 35-53; col. 10, line 49 through col. 12, line 15). It would have been obvious to one of ordinary skill in the art at the time of the invention to fabricate the medium of Girt in this manner with a Ru alloy spacer layer and a Ru and iron containing interface layer, as Girt teaches that effective magnetic recording media may have this structure and composition.

Allowable Subject Matter

13. Claims 5-8 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. Neither the reviewed prior art nor the prior art of record teaches or suggests the claimed subject matter of Claims 4-8. Particularly, laminates comprising Ru/Fe alloy AFC layers in spin valve and magnetic tunnel junction devices in the claimed combinations of structural and compositional limitations are not taught or suggested.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael La Villa whose telephone number is (571) 272-1539. The examiner can normally be reached on Tuesday, Thursday, and alternating Fridays.
15. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (571) 272-1535. The fax phone

number for the organization where this application or proceeding is assigned is 703-872-9306.

16. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael La Villa
16 September 2004

